ResearchGate

See discussions, stats, and author profiles for this publication at: https://www.researchgate.net/publication/276295931

Dementia: definitions and types

Article *in* Nursing standard: official newspaper of the Royal College of Nursing · May 2015

DOI: 10.7748/ns.29.37.37.e9405 · Source: PubMed

CITATIONS
134

READS
38,717

2 authors:

Tom Dening
University of Nottingham
369 PUBLICATIONS **10,709** CITATIONS

SEE PROFILE

Malarvizhi Babu Sandilyan
Berkshire Healthcare NHS Foundation Trust
6 PUBLICATIONS **189** CITATIONS

SEE PROFILE

All content following this page was uploaded by Tom Dening on 22 May 2015.

The user has requested enhancement of the downloaded file.

Dementia: definitions and types

Dening T, Sandilyan MB (2015) Dementia: definitions and types. Nursing Standard. 29, 37, 38-42.
Date of submission: March 2 2014; date of acceptance: August 22 2014.

Abstract

This article is the first in a series of articles on dementia and is intended as an introduction to the condition, discussing how it is defined and the different types of disease. Subsequent articles will discuss how dementia affects the brain, the clinical features of dementia, its assessment and diagnosis, and the medical management and treatment of dementia. The series will then look in depth at how nursing care can maximise the quality of life of those affected by dementia and their families.

Authors

Tom Dening Professor of dementia research, Institute of Mental Health, University of Nottingham, Nottingham, England.
Malarvizhi Babu Sandilyan Consultant in old age psychiatry, Berkshire Healthcare NHS Foundation Trust, Reading, England.
Correspondence to: Tom.Dening@nottingham.ac.uk, @TomDening

Keywords

Alzheimer's disease, dementia, dementia with Lewy bodies, frontotemporal dementia, risk factors, vascular dementia

Review

All articles are subject to external double-blind peer review and checked for plagiarism using automated software.

Online

For related articles visit the archive and search using the keywords above. Guidelines on writing for publication are vailable at: journals.rcni.com/r/author-guidelines

DEMENTIA IS AN increasingly common condition, and almost all nurses will come into contact with people with dementia and their families. Many will have personal experience of dementia, either in their own families or among people they know. Nurses should therefore be familiar with the different ways in which dementia can present and the challenges of providing care and support for people with the condition and their families. This article, the first in a series of articles on dementia, discusses the common types of dementia and explores the causes of, and risk factors for, the condition.

Definition of dementia

The ICD-10 Classification of Mental and Behavioural Disorders (World Health Organization (WHO) 1992) describes dementia as a syndrome occurring as a result of disease of the brain, which is usually chronic or progressive in nature. It consists of impairment of several higher cortical functions, which include memory, thinking, comprehension, calculation, learning, language and judgement. These impairments are often seen alongside changes in emotional control, social behaviour or motivation. Alzheimer's disease and cerebrovascular disease are among the causes of dementia (WHO 1992).

People who develop dementia before the age of 65 years are said to have early-onset (or working age) dementia and those affected after that age to have late-onset dementia. The causes of dementia are not fully understood, but the result is always structural and chemical changes in the brain, leading to neuronal loss and shrinkage of brain volume.

Prevalence

Officially, it is estimated there are about 800,000 people with dementia in the UK (Department of Health 2015). This figure has caused controversy and it has been suggested it may be too high because it is based on projections of data collected approximately 20 years ago. More recent research has suggested that the true figure may be about 670,000 (Matthews *et al* 2013), with the reduction from the projected figure perhaps because of improvements in vascular and general health in the population in recent years. This has generated lively debate. A new figure has recently been published that estimates 850,000 people with dementia in 2015, with a prevalence of 7.1% among the population aged over 65 years (Alzheimer's Society 2014).

Most of the people with dementia live in England, with current estimates in other UK countries of around 65,000 in Scotland, 45,000 in Wales and 20,000 in Northern Ireland (Alzheimer's Society 2014). Earlier data suggested that there were at least 18,000 people younger than 65 years with dementia (Harvey *et al* 2003), but this figure could be as high as 40,000 (Alzheimer's Society 2014).

As the proportion of people who live into their ninth decade is growing, it is expected that the numbers of people with dementia will continue to rise for the foreseeable future. It is projected

NS_0688.indd 38 24-04-2015 16:37:31

there will be more than two million people with dementia by 2051 (Alzheimer's Society 2014).

Dementia is a global health issue

The number of people with dementia worldwide is estimated at 44 million and is projected that it will almost double every 20 years until at least 2050 (Alzheimer's Disease International 2014). The number of new cases of dementia each year worldwide is almost 7.7 million. Most people with dementia now live in low and middle-income countries, where numbers of people living into old age have grown dramatically (Alzheimer's Disease International 2013), so this presents a huge challenge to resources.

Financial costs of dementia

In the UK, the costs of dementia are estimated at around £26 billion per annum (Alzheimer's Society 2014). This figure is approximate because we can only estimate the time spent by informal – usually family – carers, who are not paid directly for their time and effort. There are around 6.5 million people in the UK who identify themselves as carers for someone (Carers UK 2014), of whom many are caring for a person with dementia. It is estimated that carers' contribution to dementia care is worth around £11.6 billion (Alzheimer's Society 2014). Of the remainder, most money is spent on social care, especially residential and nursing care. The contribution of health services is significant but lower (Alzheimer's Society 2014).

Worldwide, it is estimated dementia costs about US$604 billion (Alzheimer's Disease International 2014).

Main causes of dementia

Dementia is not itself a single disease but rather, a clinical syndrome – that is, a collection of symptoms and other features that exist together and form a recognised pattern. The syndrome of dementia has several causes, although some are more common than others. The boundaries of the syndrome and the way it is divided up have been challenged recently by scientific and other advances (Thomas and Dening 2013). The common forms of dementia are now briefly described.

Alzheimer's disease

Alzheimer's disease is the most common form of dementia and is responsible for about 75% of cases, either on its own or with other forms of pathology (in which case we refer to 'mixed dementia'; see below). It was first described just over 100 years ago by the German psychiatrist Alois Alzheimer and is named after him (Maurer *et al* 1997).

Clinical features In the early stages, memory loss in relation to recent events, and word-finding difficulties are the most common features (Taylor and Thomas 2013). As the disease progresses, greater memory loss and language difficulties become apparent. This causes difficulty in everyday activities such as shopping, handling money and navigating routes. There may be other symptoms, for example anxiety and lack of motivation. The symptoms tend to worsen as the disease progresses (Steinberg *et al* 2008). Eventually the person becomes unable to self-care.

Brain changes In Alzheimer's disease, there is abnormal deposition of insoluble 'plaques' of a fibrous protein called amyloid and twisted fibres called 'neurofibrillary tangles' in the brain (Attems and Jellinger 2013). These abnormal plaques and tangles interfere with normal functioning of brain cells. There is also deficiency of the neurotransmitter acetylcholine, which is important for learning and memory (Piggott 2013).

Vascular dementia

Vascular dementia is the second most common type of dementia after Alzheimer's disease. It occurs when blood supply to the brain is compromised by arterial disease, which results in reduced neuronal function and eventually the death of brain cells. Numerous vascular risk factors can contribute, including hypertension, hyperlipidaemia, diabetes, smoking, diet and obesity. Diabetes causes an increased risk of dementia not only through vascular disease but also through the cerebral deposition of compounds derived from the hormone amylin (Jackson *et al* 2013).

Clinical features Vascular dementia may develop following a stroke, although progression is more often gradual than step-wise (Tatemichi *et al* 1994). Vascular dementia may have many manifestations depending on the nature and location of the pathology. In addition to memory and language difficulties, as in Alzheimer's disease, slowing of thinking processes, depression, anxiety and apathy are common (O'Brien *et al* 2003).

Dementia with Lewy bodies

Dementia with Lewy bodies is the third most common type of dementia, accounting for around 10% of cases (Matsui *et al* 2009). It is closely associated with Alzheimer's and Parkinson's diseases because it shares several characteristics with these conditions – Parkinson's disease itself

NS_0688.indd 39 24-04-2015 16:37:31

can also cause cognitive impairment and eventually dementia (Aarsland *et al* 2009). Lewy bodies, which are characteristic of this group of diseases, are small aggregations of a protein called alpha-synuclein that occur in cells in various areas of the brain, including the cerebral cortex in dementia with Lewy bodies (Attems and Jellinger 2013).

Clinical features Clinical features may include memory loss, as seen in Alzheimer's disease. There is difficulty in maintaining alertness, disorientation to space and difficulty in planning. Features similar to Parkinson's disease include trembling in limbs, shuffling when walking and reduced facial expression. Characteristic features of dementia with Lewy bodies are visual hallucinations, recurrent falls, marked fluctuations in levels of conscious awareness and disturbed sleep and/or nightmares (McKeith *et al* 2005).

Frontotemporal dementia

Frontotemporal dementia is a relatively uncommon type of dementia, and the term covers a range of conditions that affect regions in the front of the brain responsible for planning, emotion, motivation and language. There are several types of frontotemporal dementia, depending on which part of the frontal or temporal lobe is most affected (Warren *et al* 2013).

Clinical features About half of cases present with behavioural changes (behavioural variant frontotemporal dementia) and about half with problems in speech and language (primary progressive aphasia). Behaviour changes might be quite profound and may affect the personality, for example lack of inhibitions, lack of empathy, the adoption of rigid routines because of lack of mental flexibility and difficulty in planning. Eating habits may change, with overeating and preference for sweet foods. Language problems may include difficulty in producing speech or losing the meaning of words and concepts (semantic dementia).

Mixed dementia

This refers to a condition where more than one type of dementia exists. The most common type is mixed Alzheimer's and vascular dementias, where there are clinical characteristics and brain changes common to both conditions. This becomes much more common with advanced age, beyond 80 years or so, and a mixture of Alzheimer and vascular pathology is often seen at post-mortem examination (Brayne *et al* 2009).

Clinical features Mixed dementia is often characterised by a gradual decline in abilities, as in Alzheimer's disease, but with additional mini-strokes or strokes contributing to the overall picture. Alternatively, the person has a history of vascular disease or vascular risk factors, for example ischaemic heart disease, hypertension, diabetes, raised lipid levels or smoking.

Less common causes of dementia

There are several other conditions that can cause dementia (for more detailed accounts of these, see Graham 2013), including:

Huntington's disease This is an autosomal dominant inherited disease that causes abnormal movements and co-ordination difficulties, along with cognitive problems. It is a progressive condition that usually begins in middle age. Cognitive changes often occur early on (Ho *et al* 2003) and dementia is a common feature in about 50% of people with advanced Huntington's disease (Zarowitz *et al* 2014).

Corticobasal degeneration In corticobasal degeneration there is damage and shrinking of the brain, possibly as a result of abnormal protein deposits in the brain. There are movement difficulties and loss of balance, along with dementia (Grijalvo-Perez and Litvan 2014).

Creutzfeldt-Jakob disease This disease is caused by infectious protein particles in the brain called prions. The disease affects one person in one million and it may take several years for an infected person to develop symptoms. It begins with lethargy, mood disturbances and memory lapses. The disease progresses to loss of balance, and death may occur within six months of early symptoms. It may have various psychiatric presentations including dementia (Abudy *et al* 2014).

Multiple sclerosis If the damage caused by multiple sclerosis affects certain parts of the brain, cognitive difficulties that vary between individuals over a period of time can result. In particular, the degree of frontal lobe atrophy seems to predict the degree of cognitive impairment (Benedict *et al* 2002).

Normal pressure hydrocephalus In normal pressure hydrocephalus, excess fluid accumulates in the brain cavities and puts pressure on the brain. The symptoms are loss of balance, urinary incontinence and cognitive problems. It can be ameliorated by neurosurgery, although there is a lack of controlled trials and it appears dementia is the least likely feature to improve (Klassen and Ahlskog 2011).

Human immunodeficiency virus-related dementia Dementia can result from direct infection of the brain by the human immunodeficiency virus or through lack of immunity leading to other infections and

NS_0688.indd 40 24-04-2015 16:37:32

cancers of the brain. Neurocognitive disorders remain prevalent in people with human immunodeficiency virus despite progress with antiretroviral therapies (Sacktor and Robertson 2014).

Risk factors for dementia

Risk factors are those features that either increase or decrease the chances of someone developing the condition. They do not mean the person will definitely develop the condition.

Age

Age is the most consistent and significant risk factor for dementia (Launer *et al* 1999). The incidence rate (number of new cases occurring in a given time) and prevalence rate (number of cases at any one time) for dementia both double every five years from the age of 65 to 85. This does not mean that dementia is caused by age, since it is by no means certain that everyone would develop dementia if they lived long enough; certainly, not all centenarians have dementia (Poon *et al* 2012). However, age is by far the biggest single risk factor for the condition.

Gender

More women are affected by Alzheimer's disease than men (Launer *et al* 1999). Vascular dementia, on the other hand, is more common in men than women. The reasons for this are varied and debatable, but increased longevity of women could be one of them.

Genes

The genetics of Alzheimer's disease are complicated, and at least 20 genes are known to be associated

References

Aarsland D, Brønnick K, Larsen JP *et al* (2009) Cognitive impairment in incident, untreated Parkinson's disease: the Norwegian ParkWest study. *Neurology*. 72, 13, 1121-1126.

Abudy A, Juven-Wetzler A, Zohar J (2014) The different faces of Creutzfeldt-Jacob disease CJD in psychiatry. *General Hospital Psychiatry*. 36, 3, 245-248.

Alzheimer's Disease International (2013) *Dementia Statistics*. www.alz.co.uk/research/statistics (Last accessed: April 15 2015.)

Alzheimer's Disease International (2014) *World Alzheimer Report 2014: Dementia and Risk Reduction*. www.alz.co.uk/research/world-report-2014 (Last accessed: April 15 2015.)

Alzheimer's Society (2014) *Dementia UK: Update*. Second edition. Alzheimer's Society, London.

Attems J, JellingerA K (2013) Neuropathology. In Dening T, Thomas A (Eds) *Oxford Textbook of Old Age Psychiatry*. Second edition. Oxford University Press, Oxford, 87-105.

Barnes DE, Kaup A, Kirby KA, Byers AL, Diaz-Arrastia R, Yaffe K (2014) Traumatic brain injury and risk of dementia in older veterans. *Neurology*. 83, 4, 312-319.

Benedict RH, Bakshi R, Simon JH, Priore R, Miller C, Munschauer F (2002) Frontal cortex atrophy predicts cognitive impairment in multiple sclerosis. *Journal of Neuropsychiatry and Clinical Neuroscience*. 14, 1, 44-51.

Brayne C, Richardson K, Matthews FE *et al* (2009) Neuropathological correlates of dementia in over-80-year-old brain donors from the population-based Cambridge city over-75s cohort (CC75C) study. *Journal of Alzheimer's Disease*. 18, 3, 645-658.

Carers UK (2014) *Why We're Here*. http://tinyurl.com/o52mzrk (Last accessed: April 15 2015.)

Coppus A, Evenhuis H, Verberne GJ *et al* (2006) Dementia and mortality in persons with Down's syndrome. *Journal of Intellectual Disability Research*. 50. *Part*. 10, 768-77.

Department of Health (2015) *Dementia*. www.gov.uk/government/policies/improving-care-for-people-with-dementia (Last accessed: April 15 2015.)

Godbolt AK, Cancelliere C, Hincapié CA *et al* (2014) Systematic review of the risk of dementia and chronic cognitive impairment after mild traumatic brain injury: results of the International Collaboration on Mild Traumatic Brain Injury Prognosis. *Archives of Physical Medicine & Rehabilitation*. 95, 3 Suppl, S245-S256.

Graham A (2013) Neurological dementias. In Dening T, Thomas A (Eds) *Oxford Textbook of Old Age Psychiatry*. Second edition. Oxford University Press, Oxford, 491-501.

Grijalvo-Perez AM, Litvan I (2014) Corticobasal degeneration. *Seminars in Neurology*. 34, 2, 160-173.

Harvey RJ, Skelton-Robinson M, Rossor MN (2003) The prevalence and causes of dementia in people under the age of 65 years. *Journal of Neurology, Neurosurgery & Psychiatry*. 74, 9, 1206-1209.

Ho AK, Sahakian BJ, Brown RG *et al* (2003) Profile of cognitive progression in early Huntington's disease. *Neurology*. 61, 12, 1702-1706.

Hogervorst E, Yaffe K, Richards M, Huppert FA (2009) Hormone replacement therapy to maintain cognitive function in women with dementia. *Cochrane Database of Systematic Reviews*. 1, CD003799.

Hollingworth P, Harold D, Jones L, Owen MJ, Williams J (2011) Alzheimer's disease genetics: current knowledge and future challenges. *International Journal of Geriatric Psychiatry*. 26, 8, 793-802.

Jackson K, Barisone GA, Diaz E, Jin LW, DeCarli C, Despa F (2013) Amylin deposition in the brain: a second amyloid in Alzheimer disease? *Annals of Neurology*. 74, 4, 517-526.

Johansson L, Guo X, Waern M *et al* (2010) Midlife psychological stress and risk of dementia: a 35-year longitudinal population study. *Brain*. 133. *Part*. 8, 2217-2224.

Kessing LV (2012) Depression and the risk for dementia. *Current Opinion in Psychiatry*. 25, 6, 457-461.

Klassen BT, Ahlskog JE (2011) Normal pressure hydrocephalus: how often does the diagnosis hold water? *Neurology*. 77, 12, 1119-1125.

Launer LJ, Andersen K, Dewey ME *et al* (1999) Rates and risk factors for dementia and Alzheimer's disease: results from EURODEM pooled analyses. *Neurology*. 52, 1, 78-84.

Matsui Y, Tanizaki Y, Arima H *et al* (2009) Incidence and survival of dementia in a general population of Japanese elderly; the Hisayama study. *Journal of Neurology, Neurosurgery and Psychiatry*. 80, 4, 366-370.

Matthews FE, Arthur A, Barnes LE *et al* (2013) A two-decade comparison of prevalence of dementia in individuals aged 65 years and older from three geographical areas of England: results of the Cognitive Function and Ageing Study I and II. *Lancet*. 382, 9902, 1405-1412.

Maurer K, Volk S, Gerbaldo H (1997) Auguste D and Alzheimer's disease. *Lancet*. 349, 1546-1549.

NS_0688.indd 41 24-04-2015 16:37:32

with Alzheimer's disease in some way (Medway and Morgan 2014). However, most of them do not cause Alzheimer's disease so much as lead to increased susceptibility (Hollingworth *et al* 2011). Three genes, coding for different proteins (amyloid precursor protein, presenilin-1 and presenilin-2), are associated with early-onset disease but they are rare and account for fewer than one in 1,000 cases. The gene APOE type E4 is said to be associated with increased risk of developing late-onset Alzheimer's disease (Verghese *et al* 2011). Apart from these genes, having a first-degree relative with late-onset Alzheimer's disease increases one's chance of developing Alzheimer's disease only slightly. Some rare varieties of vascular dementia and frontotemporal dementia are also caused by genetic abnormalities. Huntington's disease is inherited and affects half the members of affected families.

Depression

There is a complex relationship between depression and dementia. Depression may be among the first symptoms of dementia, even before memory changes are noticed. Further, depression is a common feature in established cases of dementia, partly because of the losses the person experiences and probably partly a direct result of changes in the brain. People who are depressed have more trouble remembering things, and people with a history of depression (Wilson *et al* 2002) or midlife stress (Johansson *et al* 2010) seem to have an elevated risk of dementia. However, whether depression actually causes dementia is less clear (Kessing 2012).

Down's syndrome

People with Down's syndrome have three copies of chromosome 21. It is known this condition carries

McKeith IG, Dickson DW, Lowe J *et al* (2005) Diagnosis and management of dementia with Lewy bodies: third report of the Dementia with Lewy bodies consortium. *Neurology.* 65, 12, 1863-1872.

Medway C, Morgan K (2014) Review: The genetics of Alzheimer's disease; putting flesh on the bones. *Neuropathology and Applied Neurobiology.* 40, 2, 97-105.

Newman AB, Fitzpatrick AL, Lopez O *et al* (2005) Dementia and Alzheimer's disease incidence in relation to cardiovascular disease in the Cardiovascular Health Study cohort. *Journal of the American Geriatrics Society.* 53, 7, 1101-1107.

Nooyens AC, Bueno-de-Mesquita HB, van Gelder BM, van Boxtel MP, Verschuren WM (2014) Consumption of alcoholic beverages and cognitive decline at middle age: the Doetinchem Cohort Study. *British Journal of Nutrition.* 111, 4, 715-723.

Norton S, Matthews FE, Barnes DE, Yaffe K, Brayne C (2014) Potential for primary prevention of Alzheimer's disease: an analysis of population-based data. *Lancet Neurology.* 13, 8, 788-794.

O'Brien JT, Erkinjuntti T, Reisberg B *et al* (2003) Vascular cognitive impairment. *Lancet Neurology.* 2, 2, 89-98.

Ohara T, Doi Y, Ninomiya T *et al* (2011) Glucose tolerance status and risk of dementia in the community: the Hisayama study. *Neurology.* 77, 12, 1126-1134.

Ott A, Slooter AJ, Hofmann A (1998) Smoking and risk of dementia and Alzheimer's disease in a population-based cohort study: the Rotterdam Study. *Lancet.* 351, 9119, 1840-1843.

Piggott MA (2013) Neurochemical pathology of dementia. In Dening T, Thomas A (Eds) *Oxford Textbook of Old Age Psychiatry.* Second edition. Oxford University Press, Oxford, 107-122.

Poon L, Woodard JL, Miller LS (2012) Understanding dementia prevalence among centenarians. *Journals of Gerontology Series A: Biological Sciences and Medical Sciences.* doi: 10.1093/gerona/glr250

Posner HB, Tang MX, Luchsinger J *et al* (2002) The relationship of hypertension in the elderly to Alzheimer's disease, vascular dementia, and cognitive function. *Neurology.* 58, 8, 1175-1181.

Qiu C, Winblad B, Fratiglioni L (2005) The age-dependent relation of blood pressure to cognitive function and dementia. *Lancet Neurology.* 4, 8, 487-499.

Ruitenberg A, van Swieten JC, Witteman JC *et al* (2002) Alcohol consumption and risk of dementia: the Rotterdam study. *Lancet.* 359, 9309, 281-286.

Sacktor N, Robertson K (2014) Evolving clinical phenotypes in HIV-associated neurocognitive disorders. *Current Opinion in HIV and AIDS.* 9, 6, 517-520.

Savva GM, Stephan BCM (2010) Epidemiological studies of the effect of stroke on incident dementia: a systematic review. *Stroke.* 41, 1, E41-E46.

Sharp ES, Gatz M (2011) The relationship between education and dementia: an updated systematic review. *Alzheimer Disease and Associated Disorders.* 25, 4, 289-304.

Sofi F, Valecchi D, Bacci D *et al* (2011) Physical activity and risk of cognitive decline: a meta-analysis of prospective studies. *Journal of Internal Medicine.* 269, 1, 107-117.

Steinberg M, Shao H, Zandi P *et al* (2008) Point and 5-year period prevalence of neuropsychiatric symptoms in dementia: the Cache County Study. *International Journal of Geriatric Psychiatry.* 23, 2, 170-177.

Tatemichi TK, Paik M, Bagiella E *et al* (1994) Risk of dementia after stroke in a hospitalized cohort: results of a longitudinal study. *Neurology.* 44, 10, 1885-1891.

Taylor J-P, Thomas A (2013) Alzheimer's disease. In Dening T, Thomas A (Eds) *Oxford Textbook of Old Age Psychiatry.* Second edition. Oxford University Press, Oxford, 431-455.

Thomas A, Dening T (2013) The concept of dementia. In Dening T, Thomas A (Eds) *Oxford Textbook of Old Age Psychiatry.* Second edition. Oxford University Press, Oxford, 371-384.

Valenzuela MJ, Matthews FE, Brayne C *et al* (2012) Multiple biological pathways link cognitive lifestyle to protection against dementia. *Biological Psychiatry.* 71, 9, 783-791.

Verghese PB, Castellano JM, Holtzmann DM (2011) Apolipoprotein E in Alzheimer's disease and other neurological disorders. *Lancet Neurology.* 10, 3, 241-252.

Warren JD, Rohrer JD, Rossor MN (2013) Clinical review: frontotemporal dementia. *British Medical Journal.* 347, f4827.

Wilson RS, Barnes LL, Mendes de Leon CF *et al* (2002) Depressive symptoms, cognitive decline, and risk of Alzheimer's disease in older persons. *Neurology.* 59, 3, 364-370.

World Health Organization (1992) *The ICD-10 Classification of Mental and Behavioural Disorders: Clinical Descriptions and Diagnostic Guidelines.* WHO, Geneva.

Zarowitz BJ, O'Shea T, Nance M (2014) Clinical, demographic, and pharmacologic features of nursing home residents with Huntington's disease. *Journal of the American Medical Directors Association.* 15, 6, 423-428.

NS_0688.indd 42 24-04-2015 16:37:32

genes that are associated with amyloid production, so this may be responsible for the fact that many but not all people with Down's syndrome develop Alzheimer's disease in middle age (Coppus *et al* 2006).

Vascular risk factors

There are several of these and they commonly occur in combination with each other, which compounds their effects:

Blood pressure High blood pressure is the single most important risk factor for stroke, which can lead to vascular dementia (Posner *et al* 2002). Hypertension can also be a risk factor for Alzheimer's disease (Qiu *et al* 2005).

Diabetes mellitus People with diabetes are at an increased risk of developing dementia (Ohara *et al* 2011), because of the harmful effect of high blood glucose on the brain and the effects of diabetes on small blood vessels. These can in turn also lead to co-existing heart disease and hypertension.

Stroke

This is the single most important risk factor for developing vascular dementia and there is some evidence that it can also increase the risk of Alzheimer's disease (Savva and Stephan 2010).

Heart disease Heart conditions such as atrial fibrillation (irregular heart rhythm) and heart failure have been shown to be associated with an increased risk of developing dementia (Newman *et al* 2005).

Lifestyle factors

People's lifestyles are important influences on their risk of getting dementia. It has been estimated that about one third of the population risk for Alzheimer's disease may be accounted for by lifestyle (Norton *et al* 2014). Several of these factors probably operate by affecting vascular risk, as does obesity.

Smoking Several studies have highlighted smoking as a potential risk factor for developing Alzheimer's disease (for example, Ott *et al* 1998). It also affects the blood vessels in the brain, increasing the risk of vascular dementia.

Alcohol People who drink heavily for a prolonged period of time can develop alcohol-related dementia. High alcohol consumption can also lead to vascular changes in the brain that in turn increase the risk of developing vascular dementia. Moderate drinking may be protective to the brain (Ruitenberg *et al* 2002) and there is some research that red wine is particularly beneficial (Nooyens *et al* 2014).

Exercise and mental and social stimulation It can be difficult to disentangle cause and effect with factors such as exercise. In other words, does exercise protect against getting dementia, or is it simply that if you are starting to develop dementia you do less exercise? However, all of these factors are good for physical health as well as positive mental health, so it is certainly at least plausible that they are beneficial in preserving cognitive and social functioning. There is evidence that physical exercise can provide significant protection against cognitive decline in people who do not have dementia (Sofi *et al* 2011). Similarly, there is evidence to suggest that mental stimulation may also offer some protection (Valenzuela *et al* 2012).

Educational status Research often shows a relationship between low educational level and increased prevalence of dementia (Sharp and Gatz 2011). The explanation for this is probably that people with high educational attainment have what is described as a high neural reserve. In other words, they continue to function and do not develop symptoms of dementia until more damage has occurred, compared with someone who has less brain reserve.

Other putative risk factors

Research has looked at many other possible risk factors, for example hormone replacement therapy, treatment with non-steroidal anti-inflammatory agents and exposure to toxins such as aluminium. So far, the results do not suggest a significant link (see for example Hogervorst *et al* (2009) with regard to hormone replacement therapy). Head trauma is a plausible risk factor, but the evidence that it contributes significantly to Alzheimer's disease is not strong and findings are mixed (for example Barnes *et al* 2014, Godbolt *et al* 2014). There is also a suggestion that inflammatory processes may be a risk factor, and it is interesting that some of the genes of lesser effect in Alzheimer's disease are related to immunity and other cellular processes (Medway and Morgan 2014). This may be an exciting area for future research.

Conclusion

Dementia is common and is a worldwide health and social care issue. The condition is relevant to almost all fields of nursing and it has various causes, of which Alzheimer's disease is the most common. Dementia is associated with increasing age, but age is a risk factor, not a cause, of dementia. There are various other known risk factors for dementia, and many of these relate to vascular disease and lifestyle, which makes them promising areas for prevention and health promotion **NS**

View publication stats